

Devices for measuring the radiation induced thermal dose and their use in thermophysics

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The main characteristic of radiation is absorption of energy by the substance, which is accompanied by an adequate increase of temperature, therefore, absorbed doses in the intense flows of radiation, for example in nuclear power plants, can be measured by observing the local temperature in the parts of the device. Destruction and phase transitions in materials do not occur instantaneously but is characterized by times of relaxation. Therefore, the energy impact on the substance is convenient to describe using the concept of thermal dose, defined as the time integral of the local temperature of the studied environment. To characterize the impact of radiation fluxes on matter introduces a new concept of local thermal dose which is defined as the time integral of the temperature distribution in the investigated point in space. On the basis of chromel aluminium thermocouple developed device for measuring a local temperature dose. A set of experiments estimates the calorific value of the fuel compositions and thermal conductivity of various materials.

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